AMENDMENTS TO THE CLAIMS

This listing of the claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

Claim 1 (Previously Presented) A coating over a portion of a surface of a substrate, the coating, comprising:

a first substantially crystalline metal oxide coating layer having a first surface and an opposite surface defined as a second surface of the first coating layer with crystal size within the first coating layer increasing in a direction from the first surface of the first coating layer toward the second surface of the first coating layer;

a second substantially crystalline metal oxide coating layer having a first surface and an opposite surface defined as a second surface of the second coating layer with the first surface of the second layer in facing relationship to the second surface of the first layer and with crystal size within the second layer increasing in a direction from the first surface of the second layer toward the second surface of the second layer, and

at least one breaker layer comprising a metal oxide having at least phosphorous between the second surface of the first layer and the first surface of the second, the breaker layer interrupting crystal structure of the coating.

Claim 2 (Previously Presented) The coating according to claim 1, wherein the breaker layer is substantially amorphous.

Claim 3 (Previously Presented) The coating according to claim 1, wherein at least one of the first and second coating comprises layers at least one dopant.

Claim 4 (Canceled)

Claim 5 (Previously Presented) The coating according to claim 1, wherein the breaker layer further comprises silicon.

Claim 6 (Previously Presented) A coating over a portion of a surface of a substrate, the coating, comprising:

a substantially crystalline first metal oxide layer having a first surface and an opposite surface defined as a second surface of the first layer with crystal size within the first layer increasing in a direction from the first surface of the first layer toward the second surface of the first layer;

a substantially crystalline second metal oxide layer deposited over the first layer, the second layer having a first surface and an opposite surface defined as a second surface of the second layer with the first surface of the second layer in facing relationship to the second surface of the first layer and with crystal size within the second layer increasing in a direction from the first surface of the second layer toward the second surface of the second layer, and

a breaker layer comprising an amorphous tin oxide layer having at least phosphorous or silica between the first and second layers, to prevent or at least reduce epitaxial growth of the second layer on the first layer.

Claim 7 (Canceled)

Claim 8 (Original) The coating according to claim 6, wherein the first layer comprises a metal oxide having at least one dopant.

Claim 9 (Original) The coating according to claim 6, wherein the first layer has a thickness of about 1000 Å to about 2300 Å.

Claim 10 (Original) The coating according to claim 6, wherein at least one of the first and second layers comprises (a) a metal oxide selected from the group consisting of oxides of Zn, Fe, Mn, Al, Ti, In, Zr, Ce, Sn, Si, Cr, Sb, Co, and mixtures thereof, and (b) at least one dopant selected from the group consisting of Sn, Sb, F, In, and mixtures thereof.

Claim 11 (Original) The coating according to claim 6, wherein the second layer has a thickness of about 2000 Å to about 5000 Å.

Claim 12 and 13 (Canceled)

Claim 14 (Original) The coating according to claim 6, wherein the breaker layer has a thickness of about 100 Å to about 1000 Å.

Claim 15 (Canceled)

Claim 16 (Previously Presented) A coating over a portion of a surface of a substrate, the coating, comprising:

a substantially crystalline first layer comprising antimony doped tin oxide, the first layer having a thickness of about 1200 Å to about 2300 Å, and having a first surface and an opposite surface defined as a second surface of the first layer with crystal size within the first layer increasing in a direction from the first surface of the first layer toward the second surface of the first layer;

a substantially crystalline second layer deposited over the first layer, the second layer comprising fluorine doped tin oxide and having a thickness of about 3000 Å to about 3600 Å and having a first surface and an opposite surface defined as a second surface of the second layer with the first surface of the second layer in facing relationship to the second surface of the first layer and with crystal size within the second layer increasing in a direction from the first surface of the second layer toward the second surface of the second layer, and

a breaker layer between the first and second crystalline layers, the breaker layer comprising a tin oxide having at least phosphorous to prevent or at least reduce epitaxial growth of crystals at the first surface of the second layer on the crystals at the second surface of the first layer.

Claim 17 (Previously Presented) A coating over a portion of a substrate, comprising:

a substantially crystalline first layer comprising antimony doped tin oxide, the first layer having a thickness of about 1200 Å to about 2300 Å;

a substantially crystalline second layer deposited over the first layer, the second layer comprising fluorine doped tin oxide and having a thickness of about 3000 Å to about 3600 Å; and

a breaker layer located between the first and second crystalline layers, the breaker layer selected from a group of a metal oxide layer having at least phosphorous and a layer of a mixed oxide of tin and silica, wherein the breaker layer prevents or at least reduces epitaxial growth of the second layer on the first layer, and the breaker layer has a thickness of about 100 Å to about 1000 Å.

Claim 18 (Previously Presented) A coated article, comprising:

a substrate; and

a coating deposited over at least a portion of the substrate, the coating comprising:

a first metal oxide coating layer having crystallinity, and a first surface and an opposite surface defined as a second surface of the first coating layer with crystal size within the first coating layer increasing in a direction from the first surface of the first coating layer toward the second surface of the first coating layer;

a second metal oxide coating layer having crystallinity, and a first surface and an opposite surface defined as a second surface of the second coating layer with the first surface of the second layer in facing relationship to the second surface of the first layer and with crystal size within the second layer increasing in a direction from the first surface of the second layer toward the second surface of the second layer, and

at least one breaker layer between the second surface of the first layer and the first surface of the second, wherein the breaker layer is selected from the group of a substantially amorphous metal oxide layer having at least phosphorous and a substantially amorphous mixed oxide layer of tin

and silica, the breaker layer configured to interrupt crystal structure of the coating whereby the size of the crystals at the second surface of the first layer are larger than size of the crystals at the first surface of the second layer.

Claims 19 and 20 (Canceled)

Claim 21 (Previously Presented) The coated article according to claim 18, wherein the first coating layer further comprises at least one dopant.

Claim 22 (Canceled)

Claim 23 (Previously Presented) The coated article according to claim 18, wherein the second layer further comprises at least one dopant.

Claims 24 and 25 (Canceled)

Claim 26 (Previously Presented) A coated article, comprising:

a substrate;

a substantially crystalline first layer deposited over at least a portion of the substrate, the first layer having a first surface and an opposite surface defined as a second surface of the first layer with crystal size within the first layer increasing in a direction from the first surface of the first layer toward the second surface of the first coating layer wherein the first layer comprises a metal oxide selected from the group consisting of oxides of Zn, Fe, Mn, Al, Ti, In, Zr, Ce, Sn, Si, Cr, Sb, Co, and mixtures thereof and at least one dopant selected from the group consisting of Sn, Sb, F, In, and mixtures thereof;

an amorphous metal oxide breaker layer having phosphorous deposited over the second surface of the first layer; and

a substantially crystalline metal oxide second layer deposited over the breaker layer, the second layer having a first surface and an opposite surface defined as a second surface of the second layer with the first surface

of the second layer in facing relationship to the second surface of the first layer and with crystal size within the second layer increasing in a direction from the first surface of the second layer toward the second surface of the second layer,

wherein the breaker layer is configured to inhibit epitaxial growth of the second crystalline layer on the first crystalline layer.

Claim 27 (Original) The coated article according to claim 26, wherein the substrate is selected from the group consisting of glass, ceramic, and plastic.

Claims 28 and 29 (Canceled)

Claim 30 (Original) The coated article according to claim 26, wherein the first layer has a thickness of about 1200 Å to about 2300 Å.

Claim 31 (Canceled)

Claim 32 (Original) The coated article according to claim 26, wherein the breaker layer has a thickness of about 100 Å to about 1000 Å.

Claim 33 (Previously Presented) The coated article according to claim 26, wherein the metal oxide of the breaker layer comprises a tin oxide.

Claim 34 (Previously Presented) The coated article according to claim 26, wherein the metal oxide of the breaker layer comprises tin oxide and further comprising a dopant selected from silica and mixtures of phosphorous and silica.

Claim 35 (Previously Presented) The coated article according to claim 26, wherein the second layer further comprises at least one dopant.

Claim 36 (Previously Presented) The coated article according to claim 35, wherein the metal oxide of the second layer comprises a metal oxide selected

from the group consisting of oxides of Zn, Fe, Mn, Al, Ti, In, Zr, Ce, Sn, Si, Cr, Sb, Co, and mixtures thereof, and the at least one dopant is selected from the group consisting of Sn, Sb, F, In, and mixtures thereof.

Claim 37 (Previously Presented) The coated article according to claim 26, wherein the doped metal oxide of the first layer includes antimony doped tin oxide, with an atomic ratio of antimony to tin of about 8.0 to about 12.0

Claim 38 (Previously Presented) The coated article according to claim 35, wherein the doped metal oxide of the second layer comprises fluorine doped tin oxide, with the fluorine present in an amount of less than about 5 atomic percent.

Claim 39 (Original) The coated article according to claim 33, wherein the breaker layer has a phosphorous to tin atomic ratio of about 0.001 to about 0.10.

Claim 40 (Previously Presented) The coated article according to claim 34, wherein the breaker layer has a silica to tin atomic ratio of about 0.005 to about 0.050.

Claim 41 (Previously Presented) A coated article, comprising:

a substrate;

a substantially crystalline metal oxide layer deposited over at least a portion of the substrate, the layer having a first surface and an opposite surface defined as a second surface of the layer with crystal size within the layer increasing in a direction from the first surface of the layer toward the second surface of the layer; and

a breaker layer deposited over at least a portion of the second surface of the layer, the breaker layer selected from the group of a metal oxide layer having at least phosphorous and a mixed oxide layer of tin and silica, the breaker layer configured to prevent or at least reduce epitaxial growth from initiating on the second surface of the layer.

Claim 42 (Previously Presented) A coated article, comprising:

a substrate;

a graded color suppression layer comprising a first and second metal oxides deposited over at least a portion of the substrate, wherein the color suppression layer is about 50Å to about 3000Å thick and comprises:

a first coating region deposited over the at least a portion of the substrate, the first coating region comprising the first metal oxide and substantially no second metal oxide;

a transition region deposited over the first region, the transition region comprising the first metal oxide and the second metal oxide, with the ratio of the first metal oxide to the second metal oxide constantly changing with distance from the substrate; and

a third coating region deposited over the second coating region, the third coating region comprising the second metal oxide and substantially no first metal oxide; and

a first substantially transparent, conductive metal oxide layer deposited over the color suppression layer, wherein the conductive metal oxide layer is about 700Å to about 3000Å thick.

Claim 43 (Previously Presented) The article as claimed in claim 42, wherein the first conductive metal oxide layer includes at least two coating stratas.

Claim 44 (Canceled)

Claim 45 (Original) A coated article, comprising:

a substrate;

an antimony doped tin oxide layer deposited over the substrate and having a thickness of about 900Å to about 1500Å; and

a fluorine doped tin oxide layer deposited over the antimony doped tin oxide layer and having a thickness of about 1200Å to about 3600Å, wherein the antimony doped tin oxide layer has at least two stratas of different

antimony concentrations, with a first strata having a thickness of about 985Å and a second strata having a thickness of about 214Å.

Claims 46 – 48 (Canceled)

Claim 49 (Previously Presented) A coated article, comprising:

a substrate;

a color suppression layer deposited over at least a portion of the substrate, the color suppression layer comprising a gradient layer which transitions from one metal oxide or nitride to another;

a substantially crystalline metal oxide first layer deposited over the color suppression layer, the first layer having a first surface and an opposite surface defined as a second surface of the first layer with crystal size within the first layer increasing in a direction from the first surface of the first layer toward the second surface of the first coating layer wherein the first surface of the first layer is over the color suppression layer;

a substantially crystalline metal oxide second layer deposited over the first layer, the second layer having a first surface and an opposite surface defined as a second surface of the second layer with the first surface of the second layer in facing relationship to the second surface of the first layer and with crystal size within the second layer increasing in a direction from the first surface of the second layer toward the second surface of the second layer, and

a breaker layer between the first and second layers, the breaker layer comprising an amorphous metal oxide layer having at least phosphorous to prevent or reduce epitaxial growth of the first surface of the second layer on the second surface of the first layer.

Claim 50 (Canceled)

Claim 51 (Previously Presented) The article as claimed in claim 49, wherein the breaker layer further comprises materials selected from the group of silica and mixtures of silica and phosphorous.

Claim 52 (Original) The article as claimed in claim 49, wherein the first layer comprises antimony doped tin oxide.

Claim 53 (Original) The article as claimed in claim 49, wherein the second layer comprises fluorine doped tin oxide.

Claim 54 (Previously Presented) A coated article, comprising:

a substrate;

a first coating region deposited over at least a portion of the substrate, the first coating region comprising a metal oxide and a first dopant;

a second coating region as a transition region deposited over the first region, the transition region comprising a metal oxide, the first dopant, and a second dopant, with the ratio of the first dopant to the second dopant constantly changing with distance from the substrate; and

a third coating region deposited over the second coating region, the third coating region comprising a metal oxide and the second dopant wherein the first coating region is substantially free of the second dopant and the third region is substantially free of the first dopant.

Claim 55 (original) The coated article according to claim 54, wherein the metal oxides of the first, second, and third coating regions are each tin oxide.

Claim 56 (original) The coated article according to claim 54, wherein the first and second dopants are selected from antimony and fluorine.

Claim 57 (Previously Presented) The coated article according to claim 54, including a color suppression layer located between the first region and the substrate wherein the color suppression layer comprising a gradient layer which transitions from one metal oxide or nitride to another.

Claim 58 (Previously Presented) A coated article comprising:

a substrate;

a first coating region deposited over at least a portion of the substrate, the first coating region comprising a metal oxide and a first dopant, the first coating region having a first surface and an opposite surface defined as a second surface of the first coating region with crystal size within the first coating region increasing in a direction from the first surface of the first coating region toward the second surface of the first coating region wherein the first surface of the first coating region is over the substrate;

a transition region deposited over the first region, the transition region comprising a metal oxide, the first dopant, and a second dopant, with the ratio of the first dopant to the second dopant constantly changing as the distance from the substrate changes wherein, the transition region has a first surface and an opposite surface defined as a second surface of the transition region with crystal size within the transition region increasing in a direction from the first surface of the transition region toward the second surface of the transition region wherein the first surface of the transition region is over the second surface of the first coating region;

a second coating region deposited over the transition region, the second coating region comprising a metal oxide and the second dopant, the second coating region having a first surface and an opposite surface defined as a second surface of the second coating region with crystal size within the second coating region increasing in a direction from the first surface of the second coating region toward the second surface of the coating region wherein the first surface of the second coating region is over the second surface of the transition region, and

at least one breaker layer selected from the group of a metal oxide layer having at least phosphorous and a mixed oxide layer of tin and silica, the at least one breaker layer located between at least one of the following groups to prevent or reduce epitaxial growth between the at least one of the following groups: (a) the second surface of the first region and the first surface of the transition region, or (b) the second surface of the transition region and the first surface of the second region.

Claim 59 (Previously Presented) A method of coating a substrate, comprising the steps of:

depositing a substantially crystalline metal oxide layer defined as a first layer over at least a portion of a substrate, the first layer having a first surface and an opposite surface defined as a second surface of the first coating layer with the first surface of the first layer over the substrate and with crystal size within the first layer increasing in a direction from the first surface of the first layer toward the second surface of the first layer;

depositing a breaker layer over the second surface of the first layer, the breaker layer selected from the group of a metal oxide layer having at least phosphorous and a mixed oxide layer of tin and silica; and

depositing a substantially crystalline metal oxide layer defined as a second layer over the breaker layer, the second layer having a first surface and an opposite surface defined as a second surface of the second layer with the first surface of the second layer over the breaker layer and with crystal size within the second layer increasing in a direction from the first surface of the second layer toward the second surface of the second layer, wherein

the breaker layer is configured to prohibit or reduce epitaxial growth of the second crystalline layer on the first crystalline layer.

Claim 60 (Previously Presented) A method of coating a substrate, comprising the steps of:

depositing a substantially crystalline metal oxide layer over at least a portion of a substrate, the layer having a first surface and an opposite surface defined as a second surface of the layer with crystal size within the layer increasing in a direction from the first surface of the layer toward the second surface of the layer, and

depositing a breaker layer over the second surface of the crystalline layer, wherein the breaker layer is selected from the group of a metal oxide layer having at least phosphorous and a mixed oxide layer of tin and silica to prevent or at least reduce epitaxial growth from initiating on the second surface of the first crystalline layer.

Claim 61 (Currently Amended) A method of forming a coated article, comprising the steps of:

providing a substrate;

depositing a color suppression layer over at least a portion of the substrate, the color suppression layer comprising a gradient layer which transitions from one metal oxide or nitride to another and having a thickness of about 50Å to about 3000Å;

depositing a multi-layer over the color suppression layer, the multi-layer ~~multiplayer~~ comprising:

first substantially transparent conductive metal oxide layer over the color suppression layer, the first conductive metal oxide layer comprising antimony doped tin oxide having a thickness of about 700Å to about 3000Å; and

a second, substantially transparent, conductive metal oxide layer over the first conductive metal oxide layer, the second conductive metal oxide layer comprising fluorine doped oxide having a thickness of about 0Å to about 3000Å, and

during the practice of the depositing step increasing the thickness of the first layer within its thickness range while decreasing the thickness of the second layer within its thickness range to alter the solar properties of the ~~coated article~~ multi-layer.

Claim 62 (Canceled)

Claim 63 (Withdrawn) The coated article according to claim 48 wherein the second metal oxide is indium doped tin.

Claim 64 (Previously Presented) The coated article according to claim 54 wherein the first region has no concentration of the second dopant and the third region has no concentration of the first dopant.

Claim 65 (Previously Presented) The coated article according to claim 56 wherein the first dopant is antimony and the second dopant is fluorine.

Claim 66 (Currently Amended) The method according to claim 61 wherein the increasing step alters the total solar energy transmission and the visible light transmission of the multi-layer ~~coated article~~ while maintaining the emissivity of the multi-layer ~~article~~ substantially constant.